Illinois Department of Transportation

To:	John Fortman	Attn: District One
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	November 8, 2012	

FAI Route 94 (I-94)
Cook County
At Stony Island Feeder

We have reviewed the pavement design for the project, which was submitted to BDE by email dated October 4, 2012. The Life Cycle Cost Analysis favors the rigid pavement design by more than 10%.

The approved pavement design is as follows:

SB Stony Island (Line D) (Pavement Reconstruction)
10.5 inches of Jointed PCC Pavement with Tied PCC Shoulders
4.5 inches of HMA Stabilized Subbase
12 inches of Aggregate Subgrade Improvement

If you have any questions, please contact Paul Niedernhofer at (217) 524-1651.

Illinois Department of Transportation

Memorandum

To: John D. Baranzelli — Attn: Paul Niedernhofer

From: John Fortmann — By: Jose Dominguez

Subject: Pavement Analysis*

Date: October 4, 2012

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*Location: I-94 @ Stony Island Feeder
Route: FAI 94
Section: 2012-059-BR
County: Cook
Contract No.: 60J12
Job No: D-91-184-10 — Current target: 03CY13

We have completed the pavement analysis for the above captioned location. Review by the Central Office is required for SB Stony Island (Line D) since the total pavement area for reconstruction exceeds 4,750 Square Yards. The following is the scope of the project:

A. Pavement reconstruction of SB Stony Island (Line D) at I-94 for a total length of approximately 2,120 feet to accommodate up to two 12-foot through lanes.

A 20 year pavement analysis was performed on the below segments. We recommend a mechanistic-rigid pavement design based on the life cycle cost analysis which favors PCC pavement by over 10% on all of the following segments.

a. SB Stony Island (Line D)

Pavement Reconstruction
- Tied PCC Shoulders
- 10 ½" PCC Pavement (Jointed) [1]
- 4 ½" HMA Stabilized Subbase [2]
- 12" Aggregate Subgrade Improvement [3]

[1]Designer Note 1: Use pay item **#42000511, "PORTLAND CEMENT CONCRETE PAVEMENT 10 1/2" " (JOINTED)**" paid for in square yards.

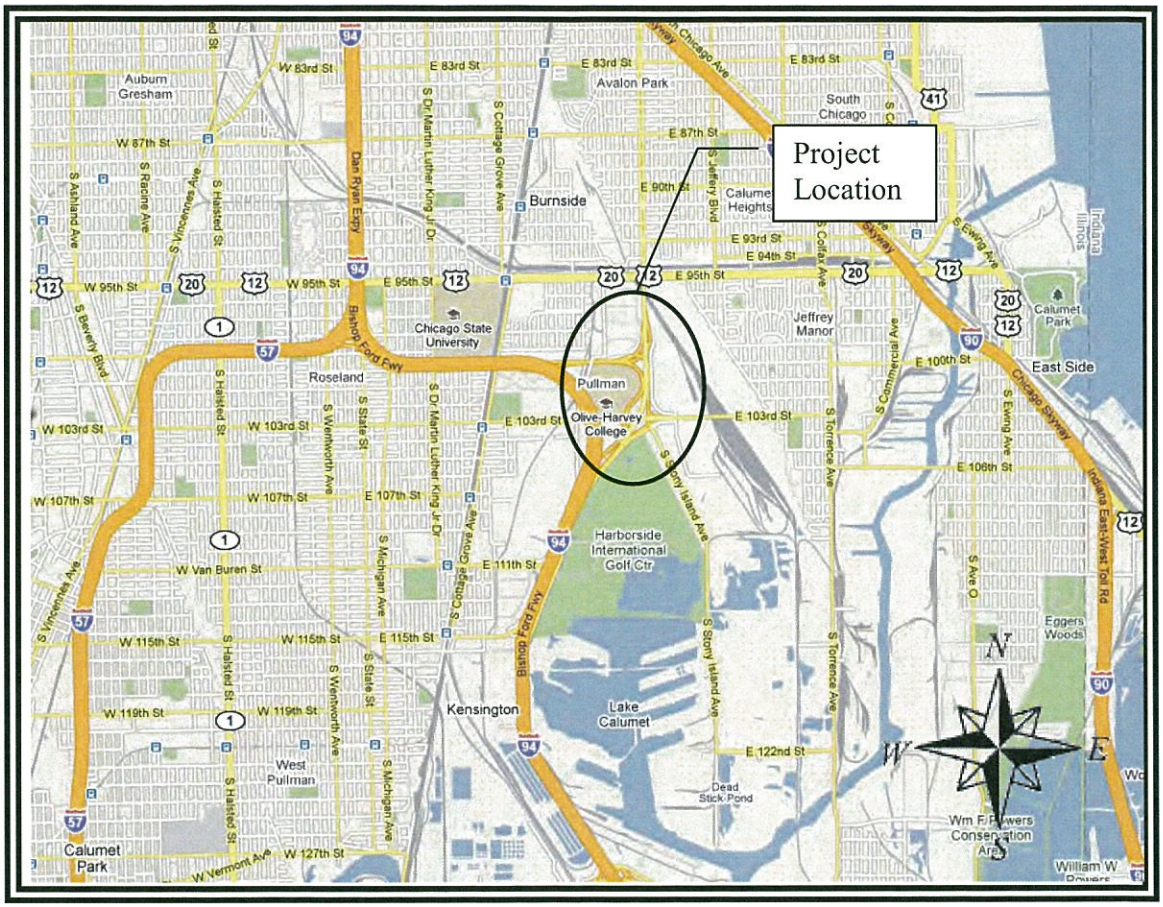
[2]Designer Note 2: Use pay item **#31200502, "STABILIZED SUBBASE - HOT-MIX ASPHALT, 4 1/2" "** paid for in square yards.

[3]Designer Note 3: Use pay item **#30300112, "AGGREGATE SUBGRADE IMPROVEMENT 12" "** paid in square yards.

If you have any questions or need additional information, please contact Jenpai Chang, Acting Pavement Engineer, at (847) 705-4432.

By: José A. Dominguez
Jose A. Dominguez, P.E.
Project Support Engineer

LOCATION MAP



Interstate 94 at Stony Island Feeder
City of Chicago, Cook County
P-91-305-07

BDE 5401 Template (Rev. 08/14/2012)

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 11/07/2013

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route:	I-94 at Stony Island Feeder	Comments:	Reconstruction		
Section:	2012-059-BR				
County:	Cook	Design Date:	09/07/2012	MR	<-- BY
Location:	SB Stony Island (Line D)	Modify Date:			<-- BY

	ADT	Year
Current:	19,600	2009
Future:	21,200	2030

Facility Type	Other Marked State Route
# of Lanes =	2 or 3
Part of future 4 lanes or more ?	No
One Way Street ?	No
Road Class:	II
Subgrade Support Rating (SSR):	Poor
Construction Year:	2013
Design Period (DP) =	20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	16,740	81.0%	P = 50%
SU =	250	1,860	9.0%	S = 50%
MU =	750	2,067	10.0%	M = 50%
Struct. Design ADT =		20,667	(2023)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	112.06		Csu =	135.78	
Cmu =	385.44		Cmu =	567.21	
TF flexible (Actual) =	10.08	(Actual ADT)	TF rigid (Actual) =	14.27	(Actual ADT)
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	4.59	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible =	10.08	
PG Grade Lower Binder Lifts =	PG 64-22	(Fig. 53-4.R)
Goto Map — HMA Mixture Temp. =	75.0	deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) =	690	ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) =	62	(Fig. 54-5.E)
Goto Map — Full Depth HMA Design Thickness =	12.25	in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness =	14.75	in. (Fig. 54-5.I)
Use Full-Depth HMA Thickness =	**12.25**	**inches**

JPC Pavement

Use TF rigid =	14.27	
Edge Support =	Tied	Shoulder or C.&G.
Rigid Pavt Thick. =	**10.25**	**in. (Fig. 54-4.E)**

CRC Pavement

Use TF rigid =	14.27	
IBR value =	3	
CRCP Thickness =	**9.25**	**in. (Fig. 54-4.N)**

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible =	10.08	
District =	3,4,5,6	
HMA Overlay Design Thickness =	**10.25**	**in. (Fig. 54-5.U)**

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness =	**NA**	**inches**

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

BDE 5401 Template (Rev. 08/14/2012) Printed: 11/07/2013

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE			I-94 at Stony Island Feeder
SECTION			2012-059-BR
COUNTY			Cook
LOCATION			SB Stony Island (Line D)
FACILITY TYPE			NON-INTERSTATE
PROJECT LENGTH		2120 FT	= = > 0.40 Miles
# OF CENTERLINES		1 CL	
# OF LANES		2 LANES	
# OF EDGES		2 EP	
LANE WIDTH - AVERAGE		12 FT	
SHOULDER WIDTH	HMA Inside	8 FT	
	HMA Outside	10 FT	

MAINTEN

PAVEMENT THICKNESS (FLEXIBLE)	12.25 IN	14.75 IN MAX	
SHOULDER THICKNESS	12.25 IN	HMA_SC	Standard Design
POLICY OVERLAY THICKNESS	2.25 IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	3.17	10.08	10.08

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$95.00 / TON
HMA TOP BINDER	$95.00 / TON
HMA LOWER BINDER	$80.00 / TON
HMA BINDER (LEVELING)	$85.00 / TON
HMA SHOULDER	$72.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(12.25")	5,653	SQ YD		$60.84	/ SQ YD	$0	
HMA SURFACE COURSE	(2.00")	5,653	SQ YD	*	$10.32	/ SQ YD	$58,342	~
HMA TOP BINDER COURSE	(2.25")	5,653	SQ YD	*	$11.44	/ SQ YD	$64,674	~
HMA LOWER BINDER COURSE	(8.00")	5,653	SQ YD	*	$37.83	/ SQ YD	$213,866	~
HMA SHOULDER	(12.25")	4,240	SQ YD	*	$48.00	/ SQ YD	$203,520	~
CURB & GUTTER		0	LIN FT		$30.00	/ LIN FT	$0	
SUBBASE GRAN MATL TY C (TONS)		0	TONS		$25.00	/ TON	$0	
IMPROVED SUBGRADE:	Aggregate	10,129	SQ YD		$10.00	/ SQ YD	$101,290	
Reserved For User Supplied Item		0	SQ YD		$0.00	/ SQ YD	$0	
Reserved For User Supplied Item		0	SQ YD		$0.00	/ SQ YD	$0	
PAVEMENT REMOVAL		5,653	SQ YD		$0.00	/ SQ YD	$0	
SHOULDER REMOVAL		4,240	SQ YD		$0.00	/ SQ YD	$0	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$641,692
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$65,182

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL	DEPTH	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	(HMA SURFACE MIX)	2.00	$10.64	/ SQ YD
HMA OVERLAY PVMT		(2.25")		2.25	$11.55	/ SQ YD
HMA SURFACE MIX		(1.50")	(HMA SURFACE MIX)	1.50	$7.98	/ SQ YD
HMA BINDER MIX		(0.75")	(Leveling Binder Mix)	0.75	$3.57	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")	(HMA SHLD MIX)	2.25	$9.07	/ SQ YD
HMA OVERLAY SHLD		(2.00")	(HMA SHLD MIX)	2.00	$8.06	/ SQ YD
MILLING (2.00 IN)				2.00	$3.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)	(HMA SURFACE MIX)	2.00	$90.00	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)	(HMA SHLD MIX)	2.00	$85.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")	(HMA L BINDER)	2.00	$90.00	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")	(HMA SHLD MIX)	2.00	$85.00	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL					$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL					$2.00	/ LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL			(100% Rehab = 110.00' / Station / Lane)		$2.00	/ LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	$847,395
FLEXIBLE TOTAL ANNUAL COST PER MILE	$86,077

PCC PAVEMENT

JPCP

ROUTE			I-94 at Stony Island Feeder		
SECTION			2012-059-BR		
COUNTY			Cook		
LOCATION			SB Stony Island (Line D)		
FACILITY TYPE			NON-INTERSTATE		
PROJECT LENGTH			2120 FT	= = >	0.40 Miles
# OF CENTERLINES			1 CL		
# OF LANES			2 LANES		
# OF EDGES			2 EP		
LANE WIDTH - AVERAGE			12 FT		
SHOULDER WIDTH	PCC	Inside	8 FT		
	PCC	Outside	10 FT		

MAINTEI

PAVEMENT THICKNESS (RIGID)	JPCP	10.25 IN	TIED SHLD	
SHOULDER THICKNESS		10.25 IN		
POLICY OVERLAY THICKNESS		2.50 IN		

RIGID PAVEMENT TRAFFIC FACTORS		MINIMUM	ACTUAL	USE
		4.59	14.27	14.27
Worksheet Construction Type is	Reconstruction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(10.25")	5,653	SQ YD		$49.00	/ SQ YD	$276,997
PAVEMENT REINFORCEMENT		0	SQ YD		$22.00	/ SQ YD	$0
STABILIZED SUBBASE	(4.50")	6,360	SQ YD		$15.00	/ SQ YD	$95,400
PCC SHOULDERS	(10.25" to 10.25")	4,240	SQ YD		$44.00	/ SQ YD	$186,560
CURB & GUTTER		0	LIN FT		$30.00	/ LIN FT	$0
SUBBASE GRAN MATL TY C	(~ 2.11")	0	TONS	*	$25.00	/ TON	$0
IMPROVED SUBGRADE:	Aggregate	10,129	SQ YD		$10.00	/ SQ YD	$101,290
Reserved For User Supplied Item		0			$0.00		$0
Reserved For User Supplied Item		0			$0.00		$0
PAVEMENT REMOVAL		5,653	SQ YD		$0.00	/ SQ YD	$0
SHOULDER REMOVAL		4,240	SQ YD		$0.00	/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$660,247
RIGID CONSTRUCTION ANNUAL COST PER MILE	$67,067

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL	DEPTH	UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")		2.50		
HMA POLICY OVERLAY PVMT	(2.50")		2.50	$12.74	/ SQ YD
HMA SURFACE MIX	(1.50")	HMA Surface Mix	1.50	$7.98	/ SQ YD
HMA BINDER MIX	(1.00")	Leveling Binder Mix	1.00	$4.76	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")		2.50	$10.08	/ SQ YD
CLASS A PAVEMENT PATCHING				$130.00	/ SQ YD
CLASS B PAVEMENT PATCHING				$130.00	/ SQ YD
CLASS C SHOULDER PATCHING				$85.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		(HMA SURFACE MIX)	1.50	$77.98	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		(HMA SURFACE MIX)	2.50	$83.30	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL				$2.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL				$2.00	/ LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)			$2.00	/ LIN FT

RIGID TOTAL LIFE-CYCLE COST	$767,236
RIGID TOTAL ANNUAL COST PER MILE	$77,934

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 11/07/13

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM		%	QUANTITY	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CNTR LINE JOINT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RNDM / THRM CRACK R&S	LIN FT	50.00%	2,332	$2.00		$4,664	
	PD PVMT PATCH M&F SURF	SQ YD	0.10%	6	$90.00		$540	
		PWFn =	0.8626	PW =	0.8626	X	$17,924	$15,461
YEAR 10								
	LONG SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CNTR LINE JOINT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RNDM / THRM CRACK R&S	LIN FT	50.00%	2,332	$2.00		$4,664	
	PD PVMT PATCH M&F SURF	SQ YD	0.50%	28	$90.00		$2,520	
		PWFn =	0.7441	PW =	0.7441	X	$19,904	$14,810
YEAR 15								
	MILL PVMT & SHLD 2.00"	SQ YD	100.00%	9,893	$3.00		$29,679	
	PD PVMT PATCH M&F ADD'L 2.00"	SQ YD	1.00%	57	$90.00		$5,130	
	HMA OVERLAY PVMT 2.00"	SQ YD	100.00%	5,653	$10.64		$60,148	
	HMA OVERLAY SHLD 2.00 "	SQ YD	100.00%	4,240	$8.06		$34,191	
		PWFn =	0.6419	PW =	0.6419	X	$129,148	$82,895
YEAR 20								
	LONG SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CNTR LINE JOINT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RNDM / THRM CRACK R&S	LIN FT	50.00%	2,332	$2.00		$4,664	
	PD PVMT PATCH M&F SURF	SQ YD	0.10%	6	$90.00		$540	
		PWFn =	0.5537	PW =	0.5537	X	$17,924	$9,924
YEAR 25								
	LONG SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CNTR LINE JOINT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RNDM / THRM CRACK R&S	LIN FT	50.00%	2,332	$2.00		$4,664	
	PD PVMT PATCH M&F SURF	SQ YD	0.50%	28	$90.00		$2,520	
		PWFn =	0.4776	PW =	0.4776	X	$19,904	$9,506
	HMA_SD							
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	SQ YD	100.00%	9,893	$3.00		$29,679	
	PD PVMT PATCH M&F ADD'L 2.00"	SQ YD	2.00%	113	$90.00		$10,170	
	PD SHLD PATCH M&F ADD'L 2.00"	SQ YD	1.00%	42	$85.00		$3,570	
	HMA OVERLAY PVMT 2.25"	SQ YD	100.00%	5,653	$11.55		$65,292	
	HMA OVERLAY SHLD 2.25 "	SQ YD	100.00%	4,240	$9.07		$38,465	
		PWFn =	0.4120	PW =	0.4120	X	$147,176	$60,635
YEAR 35								
	LONG SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CNTR LINE JOINT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RNDM / THRM CRACK R&S	LIN FT	50.00%	2,332	$2.00		$4,664	
	PD PVMT PATCH M&F SURF	SQ YD	0.10%	6	$90.00		$540	
		PWFn =	0.3554	PW =	0.3554	X	$17,924	$6,370
YEAR 40								
	LONG SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CNTR LINE JOINT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RNDM / THRM CRACK R&S	LIN FT	50.00%	2,332	$2.00		$4,664	
	PD PVMT PATCH M&F SURF	SQ YD	0.50%	28	$90.00		$2,520	
		PWFn =	0.3066	PW =	0.3066	X	$19,904	$6,102
								$205,703
	ROUTINE MAINTENANCE ACTIVITY			0.80	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$205,703
45	YEARS CRFn =	0.040785			MAINTENANCE ANNUAL COST PER MILE			$20,895

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 11/07/13

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM		%	QUANTITY	UNIT COST		COST	PRESENT WORTH
YEAR 10								
	PAVEMENT PATCH CLASS B	SQ YD	0.10%	6	$130.00		$780	
		PWFn =	0.7441	PW =	0.7441	X	$780	$580
YEAR 15								
	PAVEMENT PATCH CLASS B	SQ YD	0.20%	11	$130.00		$1,430	
		PWFn =	0.6419	PW =	0.6419	X	$1,430	$918
YEAR 20								
	PAVEMENT PATCH CLASS B	SQ YD	2.00%	113	$130.00		$14,690	
	SHOULDER PATCH CLASS C	SQ YD	0.50%	21	$85.00		$1,785	
	LONGITUDINAL SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CENTERLINE JT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
		PWFn =	0.5537	PW =	0.5537	X	$29,195	$16,165
YEAR 25								
	PAVEMENT PATCH CLASS B	SQ YD	3.00%	170	$130.00		$22,100	
	SHOULDER PATCH CLASS C	SQ YD	1.00%	42	$85.00		$3,570	
		PWFn =	0.4776	PW =	0.4776	X	$25,670	$12,260
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	SQ YD	4.00%	226	$130.00		$29,380	
	SHOULDER PATCH CLASS C	SQ YD	1.50%	64	$85.00		$5,440	
	HMA POLICY OVERLAY 2.5" (PVM	SQ YD	100.00%	5,653	$12.74		$72,019	
	HMA POLICY OVERLAY 2.5" (SHLI	SQ YD	100.00%	4,240	$10.08		$42,739	
		PWFn =	0.4120	PW =	0.4120	X	$149,578	$61,624
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CENTERLINE JT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	RANDOM CRACK R&S	LIN FT	50.00%	2,120	$2.00		$4,240	
	REFLECTIVE TRANSVERSE CRACK	LIN FT	40.00%	1,354	$2.00		$2,708	
	PD PVMT PATCH M&F HMA 2.50"	SQ YD	0.10%	6	$83.30		$500	
		PWFn =	0.3554	PW =	0.3554	X	$20,168	$7,167
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	SQ YD	0.50%	28	$130.00		$3,640	
	LONGITUDINAL SHLD JT R&S	LIN FT	100.00%	4,240	$2.00		$8,480	
	CENTERLINE JT R&S	LIN FT	100.00%	2,120	$2.00		$4,240	
	REFLECTIVE TRANSVERSE CRACK	LIN FT	60.00%	2,030	$2.00		$4,060	
	RANDOM CRACK R&S	LIN FT	50.00%	2,120	$2.00		$4,240	
	PD PVMT PATCH M&F HMA 2.50"	SQ YD	0.50%	28	$83.30		$2,332	
		PWFn =	0.3066	PW =	0.3066	X	$26,992	$8,275
								$106,989
	ROUTINE MAINTENANCE ACTIVITY			0.80	$0.00		$0	$0
							MAINTENANCE LIFE-CYCLE COST	$106,989
45	YEARS	CRFn =	0.040785				MAINTENANCE ANNUAL COST PER MILE	$10,868

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : 2:49 PM 07/19/2012

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$660,247	$641,692
		ANNUAL COST PER MILE	$67,067	$65,182
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$106,989	$205,703
		ANNUAL COST PER MILE	$10,868	$20,895
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$767,236	$847,395
		ANNUAL COST PER MILE	$77,934	$86,077

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**JPCP**	**$77,934**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**HMA**	**$86,077**	**10.4%**

P:\Pavement Design Stuff\D-1\I-94 at Stony Island [revised] 10-04-12\[SB Stony Island (Line D) Pavement Design with LCCA.xlsm]LifeCycleCost